REMARKS

In the Office Action, the Examiner objected to claims 2, 10-12, and 19-22 for informalities. The Examiner rejected claims 1-22 under 35 U.S.C. §102(b) as being anticipated by WO Patent Application WO 9734316 to Carothers et al. ("Carothers"). In this Amendment, Applicants have amended claims 1, 2, 6, 10, 11, 13, 14, and 19. Applicants have not added or canceled any claims. Accordingly, claims 1-22 will be pending in the application after entry of this Amendment.

I. Objection to Claims 2, 10-12, 19-22

In the Office Action, the Examiner objected to independent claims 2, 10, and 19 for certain informalities. The Examiner also objected to claims 11-12 and 20-22 for incorporating the informalities into the claims by claim dependencies. In this Amendment, Applicants have amended claims 2, 10, and 19. Accordingly, Applications respectfully request reconsideration and withdrawal of the objections to claims 2, 10-12, and 19-22.

II. Claims 1-10 and 13

In the Office Action the Examiner rejected claims 1-10 and 13 under §102(a) as being anticipated by Carothers. Claims 2-10 and 13 are directly or indirectly dependent on claim 1. Claim 1 recites a method for specifying a topological routing solution for a group of nets. The routing solution has one route for each net. The method initially identifies a set of initial routing solutions for each net in the group of nets, where each of the several initial routing solutions has several topological routes, where each topological route is a route that represents a set of geometric routes that are morphable into one another. The method specifies a best topological routing solution from the initially identified sets of topological routing solutions for the nets, where the best routing solution has one route for each net in the group of nets.

Applicants respectfully submit that Carothers does not specify a method for specifying a topological routing solution for a group of nets, where each topological route is a route that represents a set of geometric routes that are morphable into one another. Specifically, Carothers specifies a detailed routing method and not a topological routing method. For instance, Carothers in page 14, line 14 to page 15, line 1 specifies:

> Referring again to Figure 3, a routing system 10 suitably uses the parameters provided by the designer to generate candidate routes. In the preferred embodiment of the present invention, candidate routes are oriented only parallel to the X and Y axes. Thus, distances between the nodes in the present embodiment are configured as Manhattan distances. In alternative embodiments, however, routes may be created along diagonals and the like by changing the routing parameters. Initially, to minimize wire lengths for candidate routes, all candidate routes are confined, as shown in Figure 11, to the particular net's bounding box 1110, defined by the rectangle formed by the source and target nodes on the grid. In the present embodiment, routes having the minimum distance between nodes are confined to various routes within the bounding box.

Accordingly, Applicants respectfully submit that Carothers does not render amended claim 1 unpatentable. As claims 2-10 and 13 are directly or indirectly dependent on claim 1, Applicants respectfully submit that claims 2-10 and 13 are patentable over Carothers for at least the same reasons that were mentioned above for claim 1. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §102(b) rejection of claims 1-10 and 13 over Carothers.

III. Claims 14-22

In the Office Action, the Examiner rejected claims 14-22 under §102(b) as being anticipated by Carothers. Claims 15-22 are directly or indirectly dependent on claim 14. Claim 14 recites a computer program embedded on a computer readable medium. The computer program specifies a routing solution for a group of nets in an integrated circuit (IC) layout. The routing solution has one route for each net. The computer program has a set of instructions for initially identifying a set of initial routing solutions for each net in the group of nets, where each

of the several initial routing solutions has several routes. The computer program further has a set of instructions for specifying a best routing solution from the initially identified sets of routing solutions for the nets. Specifying the best routing solution includes considering a routing cost of nets that have not yet been selected. The best routing solution has one route for each net in the group of nets.

For at least two reasons, Applicants respectfully submit that Carothers does not disclose such a computer program that specifies a routing solution for a group of nets in an integrated circuit (IC) layout. *First*, Carothers discloses a routing system for a multichip module (MCM) layout and not an IC layout. See, Carothers, page 2, lines 9-21 and page 8, lines 18-19. Applicants respectfully submit that an MCM is an integrated circuit package which contains two or more interconnected chips. Routing methods for interconnecting several chips on an MCM package are not readily applicable to IC layouts with thousdands of routable elements. Hence, Carothers does not specify a computer readable program that specifies a routing solution for a group of nets in an integrated circuit (IC) layout

Second, Carothers does disclose, teach, or even suggest a computer readable program for specifying a best routing solution from the initially identified sets of routing solutions for a group of nets where specifying the best routing solution includes considering a routing cost of nets that have not yet been selected.

Accordingly, Applicants respectfully submit that Carothers does not render amended claim 14 unpatentable. As claims 15-22 are directly or indirectly dependent on claim 14, Applicants respectfully submit that claims 15-22 are patentable over Carothers for at least the same reasons that were mentioned above for claim 14. In view of the foregoing, Applicants

respectfully request reconsideration and withdrawal of the §102(b) rejection of claims 14-22 over Carothers.

IV. Claim 11

In the Office Action, the Examiner rejected claim 11 under §102(b) as being anticipated by Carothers. In this Amendment, Applicants have re-written claim 11 in independent form. The amended claim 11 recites a method for specifying a topological routing solution for a group of nets. The routing solution has one route for each net. The method initially identifies a set of initial routing solutions for each net in the group of nets. Each of several initial set of routing solutions has several topological routes. Each topological route is a route that represents a set of geometric routes that are morphable into one another. The method also specifies a best topological routing solution from the initially identified sets of routing solutions for the nets, where the best topological routing solution has one route for each net in the group of nets. When none of the routing solutions has a metric cost better than a metric-cost threshold, the method further a) increments the metric-cost threshold b) identifies several of routing solutions for the nets in the group of nets c) computes the metric cost for each routing solution and d) selects the routing solution that has the metric cost better than the other computed metric costs and better than the metric-cost threshold.

Applicants respectfully submit that for at least the following reasons, Carothers does not anticipate claim 11. *First*, as discussed in Section II above, Carothers does not specify a method for specifying a topological routing solution for a group of nets, where each topological route is a route that represents a set of geometric routes that are morphable into one another. Specifically, Carothers specifies a detailed routing method and not a topological routing method. For instance, Carothers in page 14, line 14 to page 15, line 1 specifies:

> Referring again to Figure 3, a routing system 10 suitably uses the parameters provided by the designer to generate candidate routes. In the preferred embodiment of the present invention, candidate routes are oriented only parallel to the X and Y axes. Thus, distances between the nodes in the present embodiment are configured as Manhattan distances. In alternative embodiments, however, routes may be created along diagonals and the like by changing the routing parameters. Initially, to minimize wire lengths for candidate routes, all candidate routes are confined, as shown in Figure 11, to the particular net's bounding box 1110, defined by the rectangle formed by the source and target nodes on the grid. In the present embodiment, routes having the minimum distance between nodes are confined to various routes within the bounding box.

Therefore, the method in Carothers is not a topological routing method.

Second, Carothers does not specify a method that when none of the routing solutions has a metric cost better than a metric-cost threshold, the method further a) increments the metric-cost threshold b) identifies several of routing solutions for the nets in the group of nets c) computes the metric cost for each routing solution and d) selects the routing solution that has the metric cost better than the other computed metric costs and better than the metric-cost threshold.

Specifically, in the Office Action, the Examiner cited page 4, lines 9-15, page 9, lines 20-23, page 19, line 1 to page 22, line 18, page 34, line 6 to page 35, line 6; page 35, line 19 to page 36, line 18, and figures 32, 35A, and 37 of Carothers to reject several claims including claim 11. Applicants respectfully submit that the cited paragraphs and figures specify method of compatibility determination and congestion determination among the routes and not the specific limitation of claim 11 for incrementing the metric-cost threshold, identifying several of routing solutions for the nets in the group of nets, computing the metric cost for each routing solution and selecting the routing solution that has the metric cost better than the other computed metric costs and better than the metric-cost threshold.

Accordingly, Applicants respectfully submit that Carothers does not render amended claim 11 unpatentable. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §102(b) rejection of claim 11 over Carothers.

CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 1-22, are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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